

**METHOD OF ENHANCING PERFORMANCE OF  
CERIUM DOPED LUTETIUM ORTHOSILICATE CRYSTALS  
AND CRYSTALS PRODUCED THEREBY**

**Abstract Of The Disclosure**

A method for enhancing the light yield of a single crystal of cerium doped lutetium orthosilicate (LSO) in response to irradiation with high energy radiation includes diffusing oxygen into the crystal by heating the crystal for a period of time in an ambient containing oxygen. This process of thermal oxygenation of the crystal effectively supplies oxygen to fill at least some of the oxygen vacancies in the body of monocrystalline LSO. A scintillation detector comprises a monocrystalline body of LSO enhanced by oxygen diffusion into the crystal.